

IN THE CLAIMS

The claims are amended as follows:

1. (original) A swivel joint apparatus for supplying utilities to a rotating building rotatable about a central axis, comprising:

an inner, fixed spindle for securing to a fixed base of a rotatable building to extend co-axially with a central axis of rotation of the building, the spindle having a series of spaced, outwardly projecting annular flanges defining a series of annular chambers between each adjacent pair of flanges, each flange having an outer peripheral edge and at least one ring seal mounted on the peripheral edge of each flange, the flanges having a predetermined outer diameter;

an outer casing rotatably mounted on the spindle for securing to part of the rotating building, the casing having an inner diameter substantially equal to the outer diameter of the flanges, the casing forming an outer wall of each of the annular chambers and being in rotatable sealing engagement with each of the ring seals to seal the chambers;

the spindle having a lower end wall with a plurality of ports for connection to fixed utility lines in the fixed base of the building for fluid supply to and from the building, and a bore extending from each port through the spindle to a respective annular chamber, whereby each chamber is connected to at least one port in the lower end wall; and

the outer casing having a series of axially spaced ports including at least one port communicating with each of said annular chambers.

2. (currently amended) ~~The apparatus as claimed in claim 1, wherein~~ A swivel joint apparatus for supplying utilities to a rotating building rotatable about a central axis, comprising:

an inner, fixed spindle for securing to a fixed base of a rotatable building to

extend co-axially with a central axis of rotation of the building, the spindle having a series of spaced, outwardly projecting annular flanges defining a series of annular chambers between each adjacent pair of flanges, each flange having an outer peripheral edge and at least one ring seal mounted on the peripheral edge of each flange, the flanges having a predetermined outer diameter;

an outer casing rotatably mounted on the spindle for securing to part of the rotating building, the casing having an inner diameter substantially equal to the outer diameter of the flanges, the casing forming an outer wall of each of the annular chambers and being in rotatable sealing engagement with each of the ring seals to seal the chambers;

the spindle having a lower end wall with a plurality of ports for connection to fixed utility lines in the fixed base of the building for fluid supply to and from the building, and a bore extending from each port through the spindle to a respective annular chamber, whereby each chamber is connected to at least one port in the lower end wall;

the outer casing having a series of axially spaced ports including at least one port communicating with each of said annular chambers;

each flange ~~has~~ having an outwardly directed, annular sensor chamber spaced outwardly from the ring seal, seal;

the outer casing ~~has~~ having a plurality of holes including at least one hole aligned with each of the sensor chambers, ~~and chambers; and~~

a plurality of fluid sensors are mounted in the outer casing to project through the respective holes to sense any leakage of fluid past any of the seals.

3. (original) The apparatus as claimed in claim 2, wherein one of the annular chambers comprises a sewer chamber for connecting rotating sewer lines within the rotatable building to fixed sewer lines within the base, the spindle having more than one bore communicating with the sewer chamber and the outer casing having a plurality of ports communicating with the sewer chamber.

4. (original) The apparatus as claimed in claim 3, wherein the annular chambers further include a water chamber for supply of water from a fixed water line in the base to water supply lines within the rotating building, and a gray water chamber for connecting at least one gray water drain line within the rotating building to gray water drain outlet line in the base.

5. (original) The apparatus as claimed in claim 4, wherein the annular chambers include a gas supply chamber for connecting a gas supply line in the base to gas supply lines within the rotatable building.

6. (currently amended) The apparatus as claimed in claim 1, wherein the annular flanges include two end flanges at opposite ends of the spindle forming an outer end wall of respective opposite end chambers, and ~~a plurality of~~ at least three spaced intermediate flanges separating forming at least four adjacent chambers along the length of the spindle, each intermediate flange having a pair of spaced ring seals projecting outwardly from its peripheral edge for rotatable sealing engagement with said outer casing, the chambers comprising at least one water chamber for communicating water from a water supply line in the base to the building, at least one gray water chamber for connecting drain lines in the building to a gray water outlet in the base, at least one gas supply chamber for connecting a gas line in the base to gas supply lines in the building, and at least one sewer chamber for connecting sewer outlets in the building to a sewer line in the base.

7. (currently amended) ~~The apparatus as claimed in claim 6, wherein~~ A swivel joint apparatus for supplying utilities to a rotating building rotatable about a central axis, comprising:

an inner, fixed spindle for securing to a fixed base of a rotatable building to extend co-axially with a central axis of rotation of the building, the spindle having a series of spaced, outwardly projecting annular flanges defining a series of annular chambers between each adjacent pair of flanges, each flange having an outer peripheral edge and at least one ring seal mounted on the peripheral edge of each flange, the flanges having a predetermined outer diameter;

an outer casing rotatably mounted on the spindle for securing to part of the rotating building, the casing having an inner diameter substantially equal to the outer diameter of the flanges, the casing forming an outer wall of each of the annular chambers and being in rotatable sealing engagement with each of the ring seals to seal the chambers;

the spindle having a lower end wall with a plurality of ports for connection to fixed utility lines in the fixed base of the building for fluid supply to and from the building, and a bore extending from each port through the spindle to a respective annular chamber, whereby each chamber is connected to at least one port in the lower end wall;

the outer casing having a series of axially spaced ports including at least one port communicating with each of said annular chambers;

the annular flanges including two end flanges at opposite ends of the spindle forming an outer end wall of respective opposite end chambers, and a plurality of spaced intermediate flanges separating adjacent chambers along the length of the spindle, each intermediate flange having a pair of spaced ring seals projecting outwardly from its peripheral edge for rotatable sealing engagement with said outer casing; and

each intermediate flange ~~has~~ having a sensor chamber between the pair of ring seals, and each end flange ~~has~~ having a sensor chamber outside the ring seal mounted on the respective end flange, ~~and a plurality of fluid sensors are being~~ mounted on the outer casing to extend into the respective sensor chambers to detect leakage of fluid past any of the ring seals, the sensors having outputs for connection to a control unit within the rotatable building to provide an alarm signal in the event of failure of any of the seals.

8. (original) The apparatus as claimed in claim 7, wherein at least two sensors are provided in each sensor chamber.

9. (original) The apparatus as claimed in claim 7, wherein at least one of the annular chambers comprises a gas supply chamber for communicating a gas supply

from the fixed base into the rotating part of the building, at least one chamber adjacent the gas supply chamber is a water chamber, and at least one water sensor and one gas sensor is provided in the sensor chamber between the gas supply chamber and water chamber.

10. (currently amended) ~~The apparatus as claimed in claim 1, wherein~~ A swivel joint apparatus for supplying utilities to a rotating building rotatable about a central axis, comprising:

an inner, fixed spindle for securing to a fixed base of a rotatable building to extend co-axially with a central axis of rotation of the building, the spindle having a series of spaced, outwardly projecting annular flanges defining a series of annular chambers between each adjacent pair of flanges, each flange having an outer peripheral edge and at least one ring seal mounted on the peripheral edge of each flange, the flanges having a predetermined outer diameter;

an outer casing rotatably mounted on the spindle for securing to part of the rotating building, the casing having an inner diameter substantially equal to the outer diameter of the flanges, the casing forming an outer wall of each of the annular chambers and being in rotatable sealing engagement with each of the ring seals to seal the chambers;

the spindle having a lower end wall with a plurality of ports for connection to fixed utility lines in the fixed base of the building for fluid supply to and from the building, and a bore extending from each port through the spindle to a respective annular chamber, whereby each chamber is connected to at least one port in the lower end wall;

the outer casing having a series of axially spaced ports including at least one port communicating with each of said annular chambers; and

~~the fixed spindle and outer casing have~~ having upper end walls, and an electrical swivel assembly is being mounted on the upper walls of the spindle and outer casing, the electrical swivel assembly comprising a fixed contact core mounted on the upper wall of the fixed spindle and an outer rotating contact portion mounted on the upper

wall of the outer casing, the spindle and contact core having aligned central through bores for passageway of fixed electrical power supply lines from the base of the building to the contact core, and the outer contact portion having contacts for connection to power supply lines supplying power to fixtures within the rotating building.

11. (original) The apparatus as claimed in claim 10, including a rotary connector mounted on said electrical swivel for supply of electrical services to the rotating building, the rotary connector having a fixed part for connection to fixed electrical service lines extending through the aligned central through bores of the spindle and electrical contact core, and a rotary part rotatably mounted on the fixed part and having conductors for connection to electrical service lines within the rotating building, the rotary part being coupled to the outer rotating contact portion of the electrical swivel.

Claims 12 to 26 (canceled)